MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2016/2017

PPC0116 – PRE-CALCULUS

(All Sections / Groups)

25 FEBRUARY 2017
2.30 p.m. – 4.30 p.m.
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This examination paper consists of **3 printed pages** (including the cover page) with **4 questions only**.

2. Each question is worth **25 marks. Attempt ALL questions.**

3. Please write all your answers in the Answer Booklet provided. **Show all relevant steps** to obtain maximum marks.

Question 1 (25 marks)

(a) Express the following **complex numbers** in standard form (a + bi):

(i) $\frac{1}{(1+i)}+\frac{1}{(2+i)}$ [5 marks]

(ii) $\frac{\bar{z}}{(z+1)}$ where $z=1-i$ [5 marks]

(b) Solve the following **equations** and/or **inequalities**:

(i) $1-x^{-1/2}+x^{-1}=1$ [5 marks]

(ii) $\sqrt{2+\sqrt{x+1}+\sqrt{x-1}}=2$ [5 marks]

(iii) $\frac{1}{x-1}+\frac{1}{x+2}\geqslant 1$ [5 marks]

Question 2 (25 marks)

(a) Determine the equation of the line in slope-intercept form that passes through the point $(-1,-1)$ and is perpendicular to the line given by $\frac{1}{2}y-\frac{1}{3}x=1$. [5 marks]

(b) Given the function $f(x)=\sqrt[2]{x+1}-1$,

(i) Find the inverse of $f(x)$. [5 marks]

(ii) Find the x-intercept(s) and y- intercept(s) of the graph of f, if any. [5 marks]

(c) Analyze the function $f(x)=\frac{x+2}{(x-1)(x+1)}$. [5 marks]

(d) Solve the logarithm equation $\log_e(1)+\log_e x^2=\log_e(x+1)$. [5 marks]

Continued...

Question 3 (25 marks)

(a) Evaluate $\frac{x^4+3x^2+5x+2}{x^2+x+1}$ using long division.

[5 marks]

(b) (i) Determine if $x-1$ is a factor of x^4+3x^2+5x+2. Justify your answer using either the Remainder Theorem or Factor Theorem. [5 marks]

(ii) Evaluate $\frac{x^4+3x^2+5x+2}{x-1}$ using synthetic division.

[5 marks]

(c) Determine the partial faction decomposition for:

(i) $\frac{x+2}{(x^2-1)}$

[5 marks]

(ii) $\frac{1}{(x^2+1)x}$ [5 marks]

Question 4 (25 marks)

(a) Upon graduation, your typical starting salary will be RM2000 per month. After each year, your salary will increase by 3%. How many years at minimum will you have worked in order to get the lump sum amount of RM100,000?

[5 marks]

(b) You ask your dad for a weekly allowance, starting with week 1 at RM1, and then having your weekly allowance doubled every week. After how many weeks will you become a millionaire?

[5 marks]

(c) Determine if the following series converges or diverges:

(i) $1 + 2 + 4 + 8 + 16 + \ldots$

(ii) $1 - 2 + 4 - 8 + 16 - \ldots$

[5+5 marks]

(d) Use the Binomial Theorem to find the numerical value of $(1.0001)^5$

[5 marks]

End of Paper